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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/527,873 03/17/00 SHOOSHTARIAN

S AGX-37

EXAMINER

MM91/0718

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ART UNIT

PAPER NUMBER

2823  
DATE MAILED:

07/18/01

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

**Office Action Summary**

Application No.

09/527,873

Applicant(s)

SHOOSHTARIAN ET AL.

Examiner

Hsien-Ming Lee

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 April 2001.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1, 2 and 4-13 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Colelli et al., U.S. Patent 5,997,175 in view of Geyling et al., U.S. Patent 5,881,208.
4. Colelli et al. teaches a method substantially as claimed for heat treating a semiconductor wafer using an in-situ closed loop real-time hot plate surface temperature monitoring system which also includes a characterization and adjustment system for controlling the hot plate surface temperature across various zones thereof ( col. 2, line 20 through col. 8, line 11 ), comprising the steps of:
  - \* placing a semiconductor in a thermal processing chamber, said semiconductor wafer defining at least one localized region along a radial axis;
  - \* adjusting the temperature of said semiconductor wafer to a predetermined temperature according to a heat cycle which includes a heating stage ( col. 2, lines 49-53; col. 2, line 60 through col. 3, line 9; col. 3, lines 56-64 );

\* during at least one stage of said heat cycle, controlling the localized temperature of said at least one localized region of said semiconductor wafer to minimize temperature deviation to be less than 0.3 C across the wafer from predetermined temperature ( col. 3, lines 15-17; col. 3, 48 51; col. 5, lines 6-14 and lines 24-34 ).

5. The method further comprising the steps of monitoring the temperature of said at least one localized region with a temperature sensing device, said temperature sensing device being communication with a controller; and based on the information received by said controller from said temperature sensing device, controlling the temperature of said at least one localized region according to said heat cycle ( figs 1-3 and col. 2, lines 49-53; col. 3, line 65 through col. 14 ). However, Colelli fails to provide a gas to selectively control the temperature. Geyling teaches a method of providing a gas to selectively control the temperature of the semiconductor wafer. See column 8, lines 16-30, where a design improvement may be accomplished by injecting certain gases, at suitable pressures into the gap between sensor 23 and wafer 80 (see fig. 8). This is analogous to the flow of gas to the gap between a wafer and chuck commonly used to control wafer temperature during low pressure CVD. In view of Geyling, it would have been obvious to one of ordinary skill in the art to recognize that providing a gas during heating of a semiconductor wafer controls the temperature (column 8, lines 19-20).

6. Claims 2, and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colelli, Jr. et al., U.S. Patent 6,100,506 in view of Geyling et al., U.S. Patent 5,881,208 as applied to claim 1 above and in further view of Champetier et al., U.S. Patent 5,997,175.

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7. Colelli in view of Geyling discloses a semiconductor process substantially as claimed as discussed above, comprising:

- \* placing a semiconductor 14 in a thermal processing chamber 12, said semiconductor wafer 14 defining at least one localized region along a radical axis ( fig. 1 );

- \* Champetier adjusting the temperature of said semiconductor wafer to a predetermined temperature according to a heat cycle which includes a heating stage, i.e. measuring a semiconductor wafer temperature by reflecting thermal radiation being emitted by a surface of the wafer and then sensing the reflected radiation at a plurality of locations wafer through pyrometers with the assistance of a control system for the purpose of adjusting the wafer temperature ( summary of the invention );

- \* during at least one stage of said heat cycle, controlling the localized temperature of said at least one localized region of said semiconductor wafer, i.e. during the stage of heat treating, controlling the localized temperature of plural locations of wafer through a control system in communication with the radiation sensing devices and with the heat source, wherein the controller can be configured to receive thermal radiation information from the radiation sensing device and based on the information to control the amount of heat being emitted by the heat source which in turn to control localized temperature of said wafer ( col. 4, line 50 through col.5, line 3 ).

8. The method further comprising the steps of monitoring the temperature of said at least one localized region with a temperature sensing device such as pyrometer, said temperature sensing device being communication with a controller; and based on the information received by said controller from said temperature sensing device, controlling the temperature of said at least one localized region according to said heat cycle ( col. col. 4, line 50 through col.5, line

3 ; col. 17, lines 19-61 ). The method also further comprises the steps of providing a gas to control the temperature of the wafer ( fig. 1 and col. 7, lines 34-40 ); the step of controlling the temperature and the flow rate of said gas ( col. 11, lines 47-58). Geyling teaches a method of providing a gas to selectively control the temperature of the semiconductor wafer. See column 8, lines 16-30, where a design improvement may be accomplished by injecting certain gases, at suitable pressures into the gap between sensor 23 and wafer 80 (see fig. 8). This is analogous to the flow of gas to the gap between a wafer and chuck commonly used to control wafer temperature during low pressure CVD. However, the combined teachings fail to teach rotating the wafer for controlling the wafer temperature. Champetier teaches controlling the wafer temperature by rotating the wafer for promoting greater temperature uniformity ( col. 7, lines 49-53 ), i.e. decrease temperature fluctuation at the plural locations of the wafer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to appreciate that Champetier's teaching implies the minimization of temperature deviation can be achieved by rotating the wafer. 8.

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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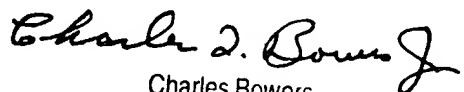
CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is (703) 305-7341. The examiner can normally be reached on Monday-Friday from 7:30 AM to 4:00 PM. During the Month of July 2001 W. David Coleman will handle questions concerning the above case. The examiner can be reached during the same time at 703-305-0004.

10.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918. The fax phone number for this Group is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



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